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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Ryosuke Usui

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EXAMINER

BREWSTER, WILLIAM M

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 05/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/724,954	Applicant(s) USUI ET AL.	
	Examiner William M. Brewster	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2005.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-14 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 08 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>040805</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The amended drawings were received on 8 April 2005. These drawings are acceptable for examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al., US Patent No. 6,083,775.

Huang anticipates a circuit device manufacturing method comprising:

In fig. 7, forming separation groove in a conductive foil, foil formed delineated by the 4 cross-hairs and also the leads on the periphery of the cross hairs where the separation grooves are at the boundaries of the foil and wherein the contiguous foil is integrally connected at the bottom between the separation grooves, from a top surface to form conductive pattern that are integrally connected at the bottom portion of the conductive foil;

in fig. 8, mounting circuit element, chip, step 101, onto one or more of the conductive pattern;

in step 103, irradiating plasma onto the top surface of the conductive foil, including the circuit element; and

in step 105, sealing with a resin layer so as to cover the circuit element and fill the separation groove,

wherein plasma is irradiated onto the top surface of the conductive foil, col. 1, lines 54-67;

limitations from claim 3, the method, in fig. 6, wherein irradiation of the plasma is carried out prior to the step of mounting the circuit element, steps 603/605, col. 5, lines 4-65;

limitations from claim 4, the method, in fig. 8, wherein irradiation of the plasma is carried out subsequent the step of mounting the circuit element, steps 101, 103, col. 5, lines 4-65;

limitations from claim 5, the method, wherein contaminants attached to the surfaces of the separation groove are removed by the plasma, col. 5, lines 42-53;

limitations from claim 12, the method, in fig. 6, wherein the circuit element comprises a semiconductor element that is electrically connected to one or more of the conductive patterns via metal wires 604, col. 5, lines 54-65.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-9, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang as applied to claims 1-5, 12 above, and further in view of Abys et al., US Patent No. 5,675,177.

Huang does not teach the use of oxygen gas in the plasma irradiation, but Abys does. Abys teaches in fig. 1 forming a conductive foil 10 with grooves at the boundaries, attaching an IC component 11,

limitations from claim 6, the method, wherein the contaminants comprise organic or inorganic matter, col. 5, lines 66 - col. 6, lines 14;

limitations from claim 7, the method, wherein the surface of the separation groove are roughened by the plasma irradiation, the adding of oxide, col. 5, lines 66 - col. 6, lines 14;

limitations from claim 8, the method, wherein the surface of the separation grooves are oxidized by the plasma irradiation, all the surfaces of the conductive foil, col. 5, lines 66 - col. 6, lines 14;

limitations from claim 9, the method, wherein the plasma irradiation is carried out using oxygen gas, col. 5, lines 66 - col. 6, lines 14;

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limitations from claim 11, in figs. 2, 3, the method, wherein the conductive foil is formed of a metal having copper 20 as the principal material, col. 3, lines 26-36. Abys gives motivation on col. 5, lines 55-65. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Abys's invention with Huang's invention would have been beneficial because it produces reliable connections between IC and mounting board.

Claim 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang as applied to claims 1-5, 12 above, and further in view of Holden, US Patent No. 3,541,379.

Huang does not specify the use of an inert gas, but Holden does. Holden teaches the method wherein the plasma irradiation is carried out using an inert gas, col. 4, lines 34-46. Holden gives motivation on col. 2, line 54 - col. 3, line 3. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Holden's invention with Huang's invention would have been beneficial because the plasma can readily initiate in high and low gas flow rates and pressures.

Claims 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang as applied to claims 1-5, 12 above, and further in view of Applicant's Admitted Prior Art.

Huang does not specify the use of an eliminating the back surface of the foil, but the AAPA does. The AAPA teaches the method,

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limitations from claim 13, the method, in fig. 10C and D, wherein the rear surface of the conductive foil 100 is eliminated until the resin layer 101 is exposed at the rear surface of the conductive foil to electrically separate the respective conductive pattern, p. 3, line 19 - p. 4, line 6;

limitations from claim 14, in fig. 10A, wherein the separation grooves 101 extend only partially through the conductive foil 100A.

The AAPA gives motivation on p. 3, line 19 - p. 4, line 6. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining the AAPA's invention with Huang's invention would have been beneficial because it does not require a supporting substrate.

Response to Arguments

Applicant's arguments filed 8 April 2005 have been fully considered but they are not persuasive. Applicant argues the rejection sent 5 January 2005 are invalid for the following reasons: 1) the grooves of Huang's reference is in the PCB board, not the foil, 2) Huang, figs. 6-8 are taken from different embodiments and thus cannot be properly combined; 3) dependent features of plasma cleaning before the chip is attached enumerated in claim 3 are not anticipated by Huang; 4) the Abys and Holden references lack some of the claimed features; and 5) one of ordinary skill in the art could not have motivation to combine the AAPA with Huang.

Examiner respectfully disagrees with the applicant. Initially, examiner discovered that the application's independent claims are 'comprising' claims allowing for other steps and features as long as they do not interfere with the enumerated limitations.

For 1) the Freyman et al., US Patent 5,635,671, incorporated by reference and in figures and explanations into Huang, states in step 502 the lamination of both sides of the substrate with an electrically conductive material such as copper, Freyman, col. 7, lines 23-28. Further Freyman states that both the holes 608 and slots 616 are formed in the substrate, Freyman col. 7, lines 12-22. Though the holes and slots are not labeled, they are prominently displayed in Huang, fig. 7. Therefore, the limitations from the application's claims are met as the conductive foil of Huang in fig. 7 is formed on the substrate with the separation grooves at the perimeter. The 'comprising' claims do not forbid a PCB substrate core underneath the conductive foil.

For 2), while the figures of Huang, may be of a different embodiments, the argument is specious. Reviewing the law of the land as written and approved by the US Congress:

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Note the 23 U.S.C. §102(b) concerns itself with inventions in a printed publication, not embodiments. It is reminded to application that the examiner has a fiduciary duty to uphold the patent law of the US.

For 3), note that while some of Huang's figures, such as figs. 6-8 concern themselves with a single chip and iteration, these drawing are heuristic. In the application, applicant enumerates for one mounting of a circuit element, but in the specification allows for several in for instance fig. 1B, and fig. 4, with circuit elements 22A and 22B. Since, as noted above, the independent claims are 'comprising' claims, other circuit elements may be added before or after the enumerated one, and the flow schematic of Huang in figs. 6, 8 may be repeated allowing for the plasma processes to be repeated before or after attaching multiple circuit elements. The claims do not limit the plasma irradiation to a particular portion of the top surface of the foil. Such obvious steps as repeating flow processes given the practitioner's needs and preferences are well known in the art. Huang specifies that his invention will include such modifications and will not be limited by the illustrative figures, in col. 13, lines 29-34.

For 4), examiner agrees that no one reference teaches all the independent and dependent claim limitations. Yet, one would not expect as such from a §103 rejection:

As a rule, obviousness is based upon what the "references takes collectively would suggest to those of ordinary skill in the art." *In re Rosselet*, 146 USPQ 183, 186 (CCPA 1965). Furthermore, one cannot show non-obviousness by merely attacking references individually where the rejections are based on combinations of references. *In re Keller*, 208 USPQ 871 (CCPA 1981); *In re Merck & Co., Inc.*, 231 USPQ 375 (Fed. Cir. 1986). Instead, there must be an absence of "some teaching, suggestion or incentive supporting the prior art combination that produces the claimed invention." *In re Bond*, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). "Just as piecemeal reconstruction of

the prior art by selecting teachings in light of [the] disclosure is contrary to the requirements of 35 USC § 103, so is the failure to consider as a whole the references collectively as well as individually." *In re Passal*, 165 USPQ 720, 723 (CCPA 1970).

For 5) examiner gives motivation as provided above, "the AAPA gives motivation on p. 3, line 19 - p. 4, line 6. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining the AAPA's invention with Huang's invention would have been beneficial because it does not require a supporting substrate." As long as the motivation is reasonable, and the inventions do not render each other useless, the examiner may combine the references for a proper §103.

For the above reasons, the rejection is deemed proper.

Conclusion

For claims 1-13:

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

For claim 14:

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William M. Brewster whose telephone number is 571-272-1854. The examiner can normally be reached on Full Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William M. Brewster

23 May 2005
WB